



Solid State Devices, Inc.

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SPMQ613-02

**600V, 400A FAST SWITCHING IGBT
 HALF BRIDGE**

Designer's Data Sheet

Part Number/Ordering Information ^{1/}

SPMQ613-02

L Screening ^{2/}

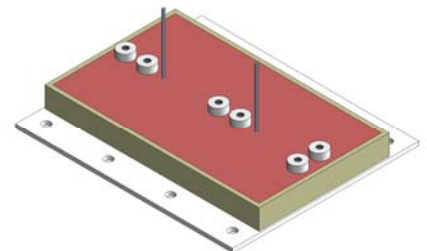
 = Not Screened
 TX = TX Level
 TXV = TXV
 S = S Level

- FEATURES:**
- Hermetic construction, electrically isolated from the heatsinking baseplate
 - Fast switching
 - dual IGBT die with ultrafast freewheeling diode
 - Low switching and conduction losses
 - TX, TXV, and Space Level Screening Available

MAXIMUM RATINGS ^{3/}	SYMBOL	VALUE	UNIT
Collector – Emitter Breakdown Voltage	V _{CES}	600	V
Gate – Emitter Voltage	V _{GES}	±20	V
Max. Continuous Collector Current	I_{C1} I_{C2}	400 200	A
		@ T _C = 25°C @ T _C = 90°C	
Pulsed Collector Current	I _{CM}	600	A
Clamped Inductive Load Current (T _J = 125°C)	I _{LM}	200	A
Reverse Voltage Avalanche Energy (I _C = 100A)	E _{ARV}	10	mJ
Operating & Storage Temperature	T _{OP} & T _{STG}	-55 to +150	°C
Maximum Thermal Resistance (Junction to Case)	R _{θJC}	0.25	°C/W
		Per switch	
Total Device Dissipation @ T _C = 25°C	P _{D1}	500	W
Dissipation Derating From @ T _C = 25°C to T _C = 150°C	P _{D2}	1	W/°C

Notes:

- 1/ For ordering information, price, and availability- Contact factory.
 2/ Screening based on MIL-PRF-19500. Screening flows available on request.
 3/ Unless otherwise specified, all electrical characteristics @25°C.





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ELECTRICAL CHARACTERISTICS ^{3/}		SYMBOL	MIN	TYP	MAX	UNIT	
Collector - Emitter Breakdown Voltage ($I_{CES} = 500\mu A, V_{GE} = 0V$)		BV_{CES}	600	670	—	V	
Gate - Emitter Threshold Voltage ($I_C = 0.5mA, V_{CE} = V_{GE}$)		$V_{GE(th)}$	$T_A = 25^\circ C$	2.5	5.2	6	V
			$T_A = 125^\circ C$	-	5.0	-	
			$T_A = -55^\circ C$	-	6.0	-	
Collector - Emitter Saturation Voltage		$V_{CE(on)}$	$I_C = 200A @ 25^\circ C$	—	1.70	2.4	V
			$I_C = 300A @ 25^\circ C$	—	2.15	-	
			$I_C = 400A @ 25^\circ C$	—	2.35	-	
			$I_C = 200A @ 125^\circ C$	—	1.65	2.2	
			$I_C = 400A @ 125^\circ C$	—	2.20	-	
			$I_C = 200A @ -55^\circ C$	—	1.70	-	
		$I_C = 400A @ -55^\circ C$	—	2.25	-		
Gate - Emitter Leakage Current ($V_{GE} = \pm 20V, V_{CE} = 0V$)		I_{GES}	$T_A = 25^\circ C$	—	0.02	1.0	μA
			$T_A = 125^\circ C$	—	0.1	10	
			$T_A = -55^\circ C$	—	0.01	-	
Collector Leakage Current ($V_{CE} = 600V, V_{GE} = 0V$)		I_{CES1} I_{CES2} I_{CES3}	$T_A = 25^\circ C$	—	50	400	μA mA μA
			$T_A = 125^\circ C$	—	7	—	
			$T_A = -55^\circ C$	—	2.5	-	
Forward Transconductance ($I_C = I_{C2}, V_{CE} = 10V$)		g_{fs}	20	—	—	S	
Gate Charge		$Q_{g(on)}$ Q_{ge} Q_{gc}	$V_{GE} = 15V$	—	1200	1500	nC
Total Gate Charge			$I_C = 10A$	—	150	300	
Gate-Emitter Charge			$V_{CE} = 300V$	—	650	750	
Gate-Collector Charge							
Capacitance		C_{ies} C_{oes} C_{res}	$V_{GE} = 0V$	—	17,000	20,000	pF
Input Capacitance			$V_{CE} = 25V$	—	3000	4,000	
Output Capacitance			$f = 1MHz$	—	1200	2,000	
Resistive Switching		$t_{d(on)}$ t_r $t_{d(off)}$ t_f	$V_{CC} = 300V$	—	150	-	nsec
Turn-On Delay Time			$V_{GE} = 15V$	—	550	-	
Rise Time			$I_C = 80A$	—	550	-	
Turn-Off Delay Time				—	2000	-	
Fall Time							
Inductive Switching		$t_{d(on)}$ t_r $t_{d(off)}$ t_f	$V_{CC} = 300V$	—	150	500	nsec
Turn-On Delay Time			$V_{GE} = 15V$	—	140	175	
Rise Time			$I_C = 80A$	—	600	1000	
Turn-Off Delay Time			$R_G = 10\Omega$	—	300	500	
Fall Time			$L = 100\mu H$	—			
ANTI-PARALLEL DIODE							
Peak Current		I_{pk}	—	—	400	A	
Peak Inverse Voltage		PIV	—	—	600	V	
Average Current		I_{avg}	—	—	200	A	
Diode Forward Voltage @ $I_F=100A, T_J=25^\circ C$		V_F	$I_F = 200A, T_A = 25^\circ C$	—	1.1	1.5	V
			$I_F = 600A, T_A = 25^\circ C$	—	1.6	-	
			$I_F = 600A, T_A = -55^\circ C$	—	1.8	-	
			$I_F = 600A, T_A = 125^\circ C$	—	1.4	-	
Reverse Recovery Time ($I_f=40A, di/dt=200A/\mu sec$)		trr	—	200	2000	nsec	

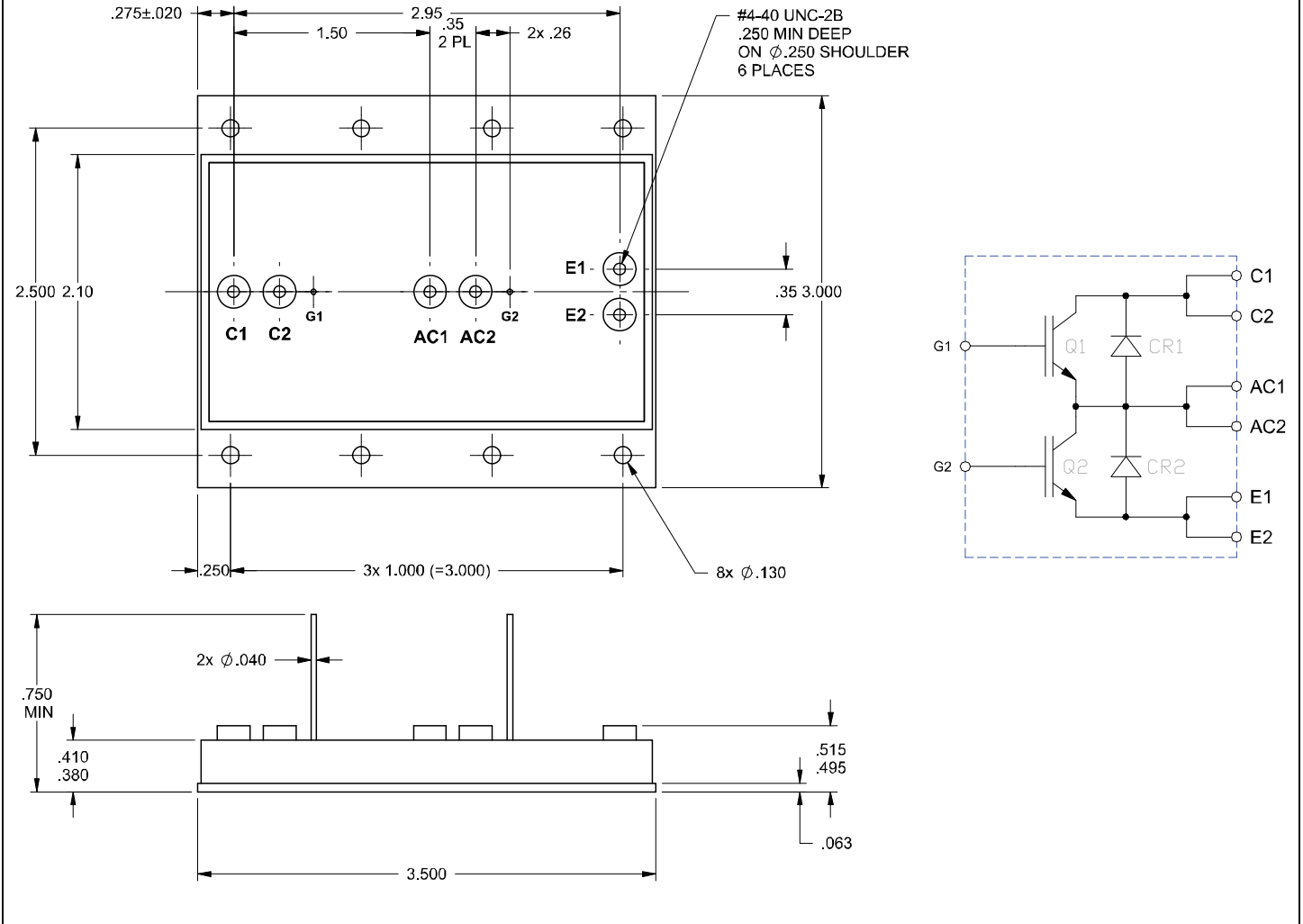
NOTE: All specifications are subject to change without notification.
SCD's for these devices should be reviewed by SSDI prior to release.

DATA SHEET #: PM0028A

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CASE OUTLINE: ASPM



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